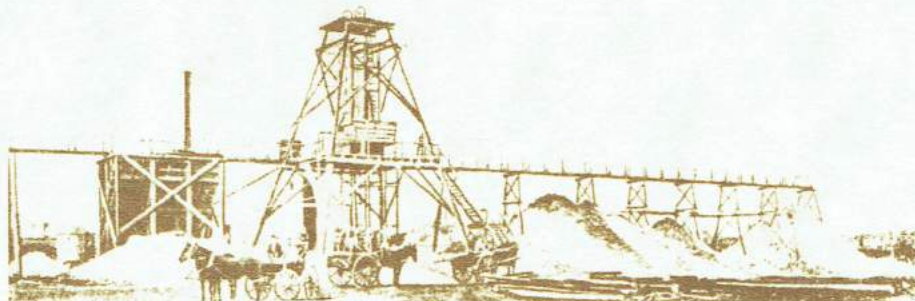




The
Institution of Engineers,
Australia

Western Australia Division

Kalgoorlie - Boulder Mining



National Engineering Landmark
Commemorative Plaque
Unveiling Ceremony

Kalgoorlie - Western Australia

Tuesday, 27 November 2001
Western Australian Museum Kalgoorlie - Boulder

Proudly presented by

***The Institution of Engineers, Australia
WA Division***



The
Institution of Engineers,
Australia

Program

Welcome

Mr Bruce James OAM Hon FIEAust CPEng
Chairman, Engineering Heritage Panel
WA Division
Institution of Engineers, Australia

Unveiling of the National Engineering Landmark

Mr Paul Robson
His Worship, The Mayor of the
City of Kalgoorlie-Boulder

Presentation of the National Engineering Landmark

Professor Peter Lee FIEAust CPEng
President, WA Division
Institution of Engineers, Australia

Acceptance of the National Engineering Landmark

Mr Ian Kealley
Chair, Advisory Board of WAMKB

Afternoon Tea

The Kalgoorlie - Boulder Mines

National Engineering Landmark

FINDING GOLD IN KALGOORLIE

THE FIRST official report of a payable gold deposit in Western Australia was made in 1885 when prospectors Charles Hall and John Slattery reported a find at what became known as Hall's Creek in the East Kimberley. Several thousand fortune-seekers joined a rush to this northern goldfield. Although the finds proved disappointing their real significance was that among those that the rush had attracted were experienced prospectors who had followed the finds of the 1880s in New Zealand and Queensland. These men remained in Western Australia to prospect the northwest districts and the eastern districts. Prospecting in the eastern districts resulted in finds in 1887 at Golden Valley and Southern Cross in 1888.

The lack of surface water supplies east of Southern Cross deterred all but the most determined from extensive searching further east. Giles McPherson found gold near what was later Coolgardie in 1888, but was so ill from dehydration that he was unable to examine or peg the area. By 1891, the hardier prospectors with improved experience of dry land prospecting were returning to the eastern districts. In 1892, Arthur Bailey and William Ford followed McPherson's directions to discover a rich find at Coolgardie. News of the find, which was flashed around Australia by telegraph, started Australia's most populous gold rush of the 1890s. Coolgardie became a tent city almost overnight. For six years the 'Old Camp', as it was popularly called, was the undisputed capital of the goldfields, and the base from which rushes to new finds radiated out.

In June 1893, three prospectors, Patrick Hannan, Tom Flanagan and Dan Shea, found the first alluvial gold at Mt Charlotte, at the north end of a line of low hills 24 miles east of Coolgardie. Within a few days of Hannan registering the claim in Coolgardie, an estimated seven hundred men were prospecting

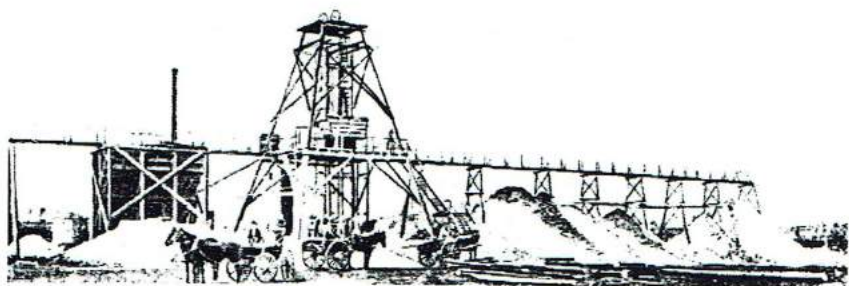
the new field at 'Hannan's', or Kalgoorlie as it was later called. It was several weeks before some miners recognized the value of dark schistose lodes south of Hannans. Pearce pegged many of the leases, which were to become some of the most valuable mines in the world. The area was to become known as The Golden Mile

ENGINEERING HERITAGE

By 1900 the underground workings of the mines on the Golden Mile were using contemporary best practice, but were hampered by the small sizes of most of the leases. Because of the rivalry between the different companies, there were few lease amalgamations before 1910. Most underground tramway lengths, therefore, remained short, and transport predominantly manual. The small leases demanded accurate surveying, which has enabled the present-day pit workings to be developed safely using the original survey records.

The Kalgoorlie-Boulder mines were by this time experiencing a crisis in confidence, and for the first time for ten years Western Australia's annual gold production fell. The extremely rich sulpho-telluride ore found at a handful of mines, which had been preferentially mined and the ore sent to smelters in the eastern colonies, had been worked out. On most mines the near-surface oxidised ore, which could be relatively easily treated, was also running out, and all mines were faced with the problem of how to treat the less rich sulpho-telluride ore which was not amenable to the cyanide process or its alternative, the chlorination process. It was then that the ore processing methods and equipment developed on the Golden Mile made a significant contribution to mineral extraction technology.

By 1905 there had been a transformation on the Golden Mile, which had become the leading centre of gold production in the world, apart from The Rand in South Africa. Technological changes had been so remarkable that Kalgoorlie-Boulder was acknowledged as the leading centre for metallurgical innovation in the world. Two successful metallurgical processes had been developed for the treatment of the sulpho-telluride ore. One involved the roasting of all mined ore followed by cyanidation, and the other the roasting of concentrates and the treatment of tailings by bromocyanide. A new procedure had been adopted in both processes, in which all the material to be treated was finely crushed to slimes and then treated in filter presses. This sliming process was also widely adopted on other goldfields



New equipment, which had been developed in Kalgoorlie for these new metallurgical techniques were also subsequently widely used overseas. The tube mill, invented for the bromocyanide process, was the most important of these. It was further developed in the 1900s on The Rand where, in conjunction with the sliming process, it had helped to bring about a major boost in production. The two most successful roaster designs, which had originated in Victoria were further developed in Kalgoorlie and were also subsequently widely used in the USA. The filter press, first used successfully in Kalgoorlie in 1897 was also widely adopted on many gold fields.

SOCIAL SIGNIFICANCE

The great influx of people into Western Australia during the 1890s had a major impact on a colony with such a small population (41 000) in 1885 when gold was discovered in the Kimberley. The main impact was felt after Bailey and Ford's discovery of Coolgardie in 1893 and Hannan's at Kalgoorlie in 1894.

By 1894 the colony's 1885 population had doubled and by 1898 it had doubled again. In that year Kalgoorlie-Boulder had a population of about 20,000, exceeding that of Coolgardie for the first time. In 1898, also, the colony's alluvial gold output had peaked at 75,000 ounces. Alluvial miners numbered 7000, compared with 13, 000 working in company mines.

By 1901 a third of the State's population, nearly 65,000 people lived on the eastern goldfields with men outnumbering women two to one. More than half lived in Kalgoorlie-Boulder, while 6,313 were employed in company mines on the East Coolgardie Goldfield (the most ever recorded). The vast majority of newcomers came from the eastern colonies. The coincidence of the depletion of many of the Victorian gold mines with the depression in that State had forced many Victorian miners to move to the Western Australian goldfields. From there they sent back money to support their families until they could afford to bring them over or could obtain special loans from the Western Australian Government to finance their passages.

The presence of so many 't'othersiders' in Western Australia had an important effect on the Federation referendum in 1900 as over half the 'Yes' votes came from the goldfields where the voting was thirteen to one in favour of Federation. Other parts of the colony, such as the metropolitan area and the northern pastoral areas, also supported Federation, and even without the goldfields the referendum might have been passed. However, the goldfields certainly played a key role, particularly in forcing the Government to call the Referendum.

NATIONAL AND REGIONAL HISTORICAL SIGNIFICANCE

The wealth and population influx generated by the Western Australian gold rushes of the 1890s was the most important factor in the development of Western Australia. Prior to becoming the last Australian colony to gain responsible government in 1890, Western Australia had struggled with the British Colonial Office to gain funding for essential infrastructure such as ports, railways and telegraph lines. After 1890 the Government under John Forrest, who was Premier throughout the 1890s, used the security of the widespread gold discoveries to borrow money on the open market to finance an extensive programme of public works. These were designed to spread the benefits of the gold discoveries throughout the different sectors of the economy - mining, agricultural, pastoral and forestry. The public works were also to lay the foundations for a greatly expanded agricultural sector and, at the same time, to channel all communications and trade through the capital, Perth. The Kalgoorlie water supply, installed between 1897 and 1903 greatly improved the social conditions for many people,

Western Australia's increasing gold production gave the colony an international economic significance for the first time which was particularly important during 1890s when the eastern colonies were recovering from the depression which had followed the bank and property crash of 1892. In 1898, for the first time, Western Australian gold production became the highest of any Australian colony. Forty-four percent of this (0.42M ounces) came from Kalgoorlie-Boulder, which in the previous year (1897) had surpassed Charters Towers, Bendigo and Mount Morgan as Australia's largest gold producing centre. In 1903, when Australia had become the largest gold producing country in the world, just over half its production came from Western Australia. In that year, the State had a record output of 2.31M ounces, of which Kalgoorlie-Boulder produced 1.27M ounces, three times its output in 1898.

KEY PERSONS ASSOCIATED WITH DEVELOPMENT OF THE MINES

Richard Hamilton

The outstanding mine manager of his generation on the Golden Mile, Hamilton managed Great Boulder Pty, 1896-1927, developing the mine with foresight and caution.

Herbert Hoover

Partner in Bewick Moreing and Company, British mining consultants and mine managers, 1902-1908, Hoover was responsible for the management of up to twenty mines in Western Australia, including Lake View Consols, Hannans Brownhill GMC (later Brownhill Oroya) and South Kalgoorlie GM.

George Klug

One of Kalgoorlie's outstanding metallurgists, Klug designed and managed smelters at the Golden Horse-Shoe, South Fremantle and Ravensthorpe.

George Ridgway

Chief engineer at the Great Boulder Pty. mine, Ridgway was one of Kalgoorlie's most prolific inventors of ore processing equipment.

STEAM POWER AND WOOD FUEL

During the 1900s Kalgoorlie-Boulder had the largest concentration of stationary steam engines in Australia. Large tandem compound steam engines were then in their final stage of development and these were used by most mines on the Golden Mile as winder engines and mill engines. The first reliable steam powered air compressors were also produced in the 1900s and horizontal cross compound compressors were used for powering rock drills at all the major mines.

Two of the large mines generated their own electricity for lighting and operating electrified plant. The majority of other mines received electricity from Kalgoorlie Electric Power and Lighting Corporation (KEPLC), a private company whose generating station was the largest in the state (4 MW in 1914) until the opening of the Government's East Perth Power Station in 1918. In addition to servicing the mines it also provided power to the Kalgoorlie Electric Tramways Co. and lighting for the Kalgoorlie Road Board.

Initially the mines used coal from Newcastle (NSW) or Collie (WA) as their main fuel but once their boilers had been adapted for firing by eucalypt wood, local timber became by far the cheapest and most effective fuel in the goldfields region. In the early days, the Kalgoorlie mines employed contractors to cut firewood and deliver it to the mines or sidings along the Perth to Kalgoorlie railway. 1900 had cut out all timber within carting distance of Kalgoorlie and of the railway sidings. A number of firewood supply companies were then formed to organise woodcutter's camps in the bush and to carry firewood to Kalgoorlie by narrow gauge railways ('woodlines').

The heaviest timber usage occurred in the years from 1904 to 1914, when large tonnages of ore were being mined and most mines were roasting all their mined ore using firewood fuel. During that time, quantities used per year were probably between 400,000 and 600,000 tonnes. In the woodland cut for the Kalgoorlie mines, yields per hectare of from seven to nine tonnes of firewood and mining structural timber were obtained, resulting in an area of over 60,000 hectares being cut over each year (without allowing for the large areas covered by salt lakes). It has been estimated that during the twentieth century a total of about 25 to 30 million tonnes of timber were cut on the goldfields from an area of up to 4 million hectares.

KALGOORLIE - BOULDER MINING TODAY

The area known as the Golden Mile is now operated by Kalgoorlie Consolidated Gold Mines as Australia's largest open pit gold mine, commonly known as the Super Pit. When fully developed the pit is expected to be 4 km long, 1.5 km wide and 650m deep. The pit is estimated to have a remaining life of about 14 years (from March 2001) but potential exists for 'a significant increase in mine life', possibly including underground operations.

In the year ending 30 June 2000, 0.67 million ounces of gold was produced from the Super Pit, which is about half the maximum quantity produced by all the Kalgoorlie mines in their peak year of the 1900s. To produce the 1903 figure of 1.27 million ounces, 0.983 million tonnes of ore had to be mined. By comparison in year 1999-2000 to produce half the 1903 quantity of gold 10.20 million tons of ore had to be mined, over ten times the 1903 quantity.





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